

SEQUENCE LISTING

<110> Mahajan, Pramod
Zuo, Zhuang

<120> Poly ADP-Ribose Polymerase Gene and its
Uses

<130> 5718-34

<140> US 09/236,995
<141> 1999-01-26

<150> US 60/072,785
<151> 1998-01-27

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<170> FastSEQ for Windows Version 4.0

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<221> misc_feature
<222> 1584, 1588, 2078, 2107
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Arg Ala Ser Cys Lys Ser Cys Arg Ser Pro Ile Ala Lys Asp Gln Leu
20 25 30

cgt ctt ggc aag atg gtt cag gcg tca cag ttc gac ggc ttc atg ccg 144
Arg Leu Gly Lys Met Val Gln Ala Ser Gln Phe Asp Gly Phe Met Pro
35 40 45

atg tgg aac cat gcc agg tgc atc ttc agc aag aac cag ata aaa 192
Met Trp Asn His Ala Arg Cys Ile Phe Ser Lys Lys Asn Gln Ile Lys
50 55 60

tcc gtt gac gat gtt gaa ggg ata gat gca ctt aga tgg gat gat caa 240
Ser Val Asp Asp Val Glu Gly Ile Asp Ala Leu Arg Trp Asp Asp Gln
65 70 75 80

gag aag ata cga aac tac gtt ggg agt gcc tca gct ggt aca agt tct 288

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Thr Ala Ala Pro Pro Glu Lys Cys Thr Ile Glu Ile Ala Pro Ser Ala			
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Arg Thr Ser Cys Arg Arg Cys Ser Glu Lys Ile Thr Lys Gly Ser Val			
115	120	125	
cgt ctt tca gct aag ctt gag agt gaa ggt ccc aag ggt ata cca tgg			432
Arg Leu Ser Ala Lys Leu Glu Ser Glu Gly Pro Lys Gly Ile Pro Trp			
130	135	140	
tat cat gcc aac tgt ttc ttt gag gta tcc ccg tct gca act gtt gag			480
Tyr His Ala Asn Cys Phe Phe Glu Val Ser Pro Ser Ala Thr Val Glu			
145	150	155	160
aag ttc tca ggc tgg gat act ttg tcc gat gag gat aag aga acc atg			528
Lys Phe Ser Gly Trp Asp Thr Leu Ser Asp Glu Asp Lys Arg Thr Met			
165	170	175	
ctc gat ctt gtt aaa aaa gat gtt ggc aac aat gaa caa aat aag ggt			576
Leu Asp Leu Val Lys Lys Asp Val Gly Asn Asn Glu Gln Asn Lys Gly			
180	185	190	
tcc aag cgc aag aaa agt gaa aat gat att gat agc tac aaa tcc gcc			624
Ser Lys Arg Lys Lys Ser Glu Asn Asp Ile Asp Ser Tyr Lys Ser Ala			
195	200	205	
agg tta gat gaa agt aca tct gaa ggt aca gtg cga aac aaa ggg caa			672
Arg Leu Asp Glu Ser Thr Ser Glu Gly Thr Val Arg Asn Lys Gly Gln			
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ctt gta gac cca cgt ggt tcc aat act agt tca gct gat atc caa cta			720
Leu Val Asp Pro Arg Gly Ser Asn Thr Ser Ser Ala Asp Ile Gln Leu			
225	230	235	240
aag ctt aag gag caa agt gac aca ctt tgg aag tta aag gat gga ctt			768
Lys Leu Lys Glu Gln Ser Asp Thr Leu Trp Lys Leu Lys Asp Gly Leu			
245	250	255	
aag act cat gta tcg gct gct gaa tta agg gat atg ctt gag gct aat			816
Lys Thr His Val Ser Ala Ala Glu Leu Arg Asp Met Leu Glu Ala Asn			
260	265	270	
ggg cag gat aca tca gga cca gaa agg cac cta ttg gat cgc tgt gcg			864
Gly Gln Asp Thr Ser Gly Pro Glu Arg His Leu Leu Asp Arg Cys Ala			
275	280	285	
gat gga atg cta ttt gga gcg ctg ggt cct tgc cca gtc tgt gct aat			912
Asp Gly Met Leu Phe Gly Ala Leu Gly Pro Cys Pro Val Cys Ala Asn			
290	295	300	
ggc atg tac tat tat aat ggt cag tac caa tgc agt ggt aat gtg tca			960

Gly	Met	Tyr	Tyr	Tyr	Asn	Gly	Gln	Tyr	Gln	Cys	Ser	Gly	Asn	Val	Ser		
305					310				315					320			
gag tgg tcc aag tgt aca tac tct gcc aca gaa cct gtc cgc gtt aag															1008		
Glu	Trp	Ser	Lys	Cys	Thr	Tyr	Ser	Ala	Thr	Glu	Pro	Val	Arg	Val	Lys		
														325	330	335	
aag aag tgg caa att cca cat gga aca aag aat gat tac ctt atg aag															1056		
Lys	Lys	Trp	Gln	Ile	Pro	His	Gly	Thr	Lys	Asn	Asp	Tyr	Leu	Met	Lys		
														340	345	350	
tgg ttc aaa tct caa aag gtt aag aaa cca gag agg gtt ctt cca cca															1104		
Trp	Phe	Lys	Ser	Gln	Lys	Val	Lys	Lys	Pro	Glu	Arg	Val	Leu	Pro	Pro		
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atg tca cct gag aaa tct gga agt aaa gca act cag aga aca tca ttg															1152		
Met	Ser	Pro	Glu	Lys	Ser	Gly	Ser	Lys	Ala	Thr	Gln	Arg	Thr	Ser	Leu		
														370	375	380	
ctg tct tct aaa ggg ttg gat aaa tta agg ttt tct gtt gta gga caa															1200		
Leu	Ser	Ser	Lys	Gly	Leu	Asp	Lys	Leu	Arg	Phe	Ser	Val	Val	Gly	Gln		
														385	390	395	400
tca aaa gaa gca gca aat gag tgg att gag aag ctc aaa ctt gct ggt															1248		
Ser	Lys	Glu	Ala	Ala	Asn	Glu	Trp	Ile	Glu	Lys	Leu	Lys	Leu	Ala	Gly		
														405	410	415	
gcc aac ttc tat gcc agg gtt gtc aaa gat att gat tgt tta att gca															1296		
Ala	Asn	Phe	Tyr	Ala	Arg	Val	Val	Lys	Asp	Ile	Asp	Cys	Leu	Ile	Ala		
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tgt ggt gag ctc gac aat gaa aat gct gaa gtc agg aaa gca agg agg															1344		
Cys	Gly	Glu	Leu	Asp	Asn	Glu	Asn	Ala	Glu	Val	Arg	Lys	Ala	Arg	Arg		
														435	440	445	
ctg aag ata cca att gta agg gag ggt tac att gga gaa tgt gtt aaa															1392		
Leu	Lys	Ile	Pro	Ile	Val	Arg	Glu	Gly	Tyr	Ile	Gly	Glu	Cys	Val	Lys		
														450	455	460	
aga aca aaa tgc tgc cat ttg att tgt ata aac tgg aat gcc tta gag															1440		
Arg	Thr	Lys	Cys	Cys	His	Leu	Ile	Cys	Ile	Asn	Trp	Asn	Ala	Leu	Glu		
														465	470	475	480
tcc tca aaa ggc mgt act gtc act gtt aaa gtt aag ggc cga agt gct															1488		
Ser	Ser	Lys	Gly	Xaa	Thr	Val	Thr	Val	Lys	Val	Lys	Gly	Arg	Ser	Ala		
														485	490	495	
tgt tca tya agt cct cyg gtt tgc aag aat act gct cac att cct tra															1536		
Cys	Ser	Xaa	Ser	Pro	Xaa	Val	Cys	Lys	Asn	Thr	Ala	His	Ile	Pro	Xaa		
														500	505	510	
gra tgg gaa aag cat ata caa tgc amc ctt aaa cat gtt ctg acc tgn															1584		
Xaa	Trp	Glu	Lys	His	Ile	Gln	Cys	Xaa	Leu	Lys	His	Val	Leu	Thr	Xaa		
														515	520	525	
cac nag gtg tgy aca ggc tac tat gta ctc cag atc att gaa cag gat															1632		

His Xaa Val Cys Thr Gly Tyr Tyr Val Leu Gln Ile Ile Glu Gln Asp			
530	535	540	
gat ggg tct gag tgc tac gta ttt cgt aag tgg gga cgg gtt ggg agt			1680
Asp Gly Ser Glu Cys Tyr Val Phe Arg Lys Trp Gly Arg Val Gly Ser			
545	550	555	560
gag aaa att gga ggg caa aaa ctg gag gag atg tca aaa act gag gca			1728
Glu Lys Ile Gly Gly Gln Lys Leu Glu Glu Met Ser Lys Thr Glu Ala			
565	570	575	
atc aag gaa ttc aaa aga tta ttt ctt gag aag act gga aac tca tgg			1776
Ile Lys Glu Phe Lys Arg Leu Phe Leu Glu Lys Thr Gly Asn Ser Trp			
580	585	590	
gaa gct tgg gaa tgt aaa acc aat ttt cgg aag cag cct ggg aga ttt			1824
Glu Ala Trp Glu Cys Lys Thr Asn Phe Arg Lys Gln Pro Gly Arg Phe			
595	600	605	
tac cca ctt gat gtt gat tat ggt gtt aag aaa gca cca aaa cgg aaa			1872
Tyr Pro Leu Asp Val Asp Tyr Gly Val Lys Lys Ala Pro Lys Arg Lys			
610	615	620	
gat atc agt gaa atg aaa agt tct ctt gct cct caa ttg cta gaa ctc			1920
Asp Ile Ser Glu Met Lys Ser Ser Leu Ala Pro Gln Leu Leu Glu Leu			
625	630	635	640
atg aag atg ctt ttc aat gtg gag aca tat aga gct gct atg atg gaa			1968
Met Lys Met Leu Phe Asn Val Glu Thr Tyr Arg Ala Ala Met Met Glu			
645	650	655	
ttt gaa awt aat atg tca gaa atg cct ctt ggg aag cta agc mag gra			2016
Phe Glu Xaa Asn Met Ser Glu Met Pro Leu Gly Lys Leu Ser Xaa Xaa			
660	665	670	
aat att gag raa gga ttt gaa gca tta act krg rta cmg rat tta ttt			2064
Asn Ile Glu Xaa Gly Phe Glu Ala Leu Thr Xaa Xaa Xaa Leu Phe			
675	680	685	
gaa gga cac cgc tna tca agc act ggc ttg ttr gag aaa gct naa ttg			2112
Glu Gly His Arg Xaa Ser Ser Thr Gly Leu Xaa Glu Lys Ala Xaa Leu			
690	695	700	
ttg ytg sga gcm ats syt ttt tca ctc tta tcc ctt cta ttc atc ctc			2160
Leu Xaa Xaa Xaa Xaa Phe Ser Leu Leu Ser Leu Leu Phe Ile Leu			
705	710	715	720
ata tta tac ggg atg agg atg att tca tat tca aag gcg aaa atg ctt			2208
Ile Leu Tyr Gly Met Arg Met Ile Ser Tyr Ser Lys Ala Lys Met Leu			
725	730	735	
gaa gct ctg cag gat att gaa att gct tca aag ata gtt ggc ttc gat			2256
Glu Ala Leu Gln Asp Ile Glu Ile Ala Ser Lys Ile Val Gly Phe Asp			
740	745	750	
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Ser	Asp	Ser	Asp	Glu	Ser	Leu	Asp	Asp	Lys	Tyr	Met	Lys	Leu	His	Cys		
755						760					765						
gac atc acc ccg ctg gct cac gat agt gaa gat tac aag tta att gag															2352		
Asp	Ile	Thr	Pro	Leu	Ala	His	Asp	Ser	Glu	Asp	Tyr	Lys	Leu	Ile	Glu		
770						775					780						
cag tat ctc ctc aac aca cat gct cct act cac aag gac tgg tcg ctg															2400		
Gln	Tyr	Leu	Leu	Asn	Thr	His	Ala	Pro	Thr	His	Lys	Asp	Trp	Ser	Leu		
785						790					795			800			
gaa ctg gag gaa gtt ttt tca ctt gat cga gat gga gaa ctt aat aag															2448		
Glu	Leu	Glu	Glu	Val	Phe	Ser	Leu	Asp	Arg	Asp	Gly	Glu	Leu	Asn	Lys		
805						810					815						
tac tca aga tat aaa aat aat ctg cat aac aag atg cta tta tgg cac															2496		
Tyr	Ser	Arg	Tyr	Lys	Asn	Asn	Leu	His	Asn	Lys	Met	Leu	Leu	Trp	His		
820						825					830						
gg tca agg ttg acg aat ttt gtg gga att ctt agt caa ggg cta aga															2544		
Gly	Ser	Arg	Leu	Thr	Asn	Phe	Val	Gly	Ile	Leu	Ser	Gln	Gly	Leu	Arg		
835						840					845						
att gca cct cct gag gca cct gtt act ggc tat atg ttc ggc aaa ggc															2592		
Ile	Ala	Pro	Pro	Glu	Ala	Pro	Val	Thr	Gly	Tyr	Met	Phe	Gly	Lys	Gly		
850						855					860						
ctc tac ttt gca gat cta gta agc aag agc gca caa tac tgt tat gtg															2640		
Leu	Tyr	Phe	Ala	Asp	Leu	Val	Ser	Lys	Ser	Ala	Gln	Tyr	Cys	Tyr	Val		
865						870					875			880			
gat agg aat aat cct gta ggt ttg atg ctt ctt tct gag gtt gct tta															2688		
Asp	Arg	Asn	Asn	Pro	Val	Gly	Leu	Met	Leu	Leu	Ser	Glu	Val	Ala	Leu		
885						890					895						
gga gac atg tat gaa cta aag aaa gcc acg tcc atg gac aaa cct cca															2736		
Gly	Asp	Met	Tyr	Glu	Leu	Lys	Lys	Ala	Thr	Ser	Met	Asp	Lys	Pro	Pro		
900						905					910						
aga ggg aag cat tcg acc aag gga tta ggc aaa acc gtg cca ctg gag															2784		
Arg	Gly	Lys	His	Ser	Thr	Lys	Gly	Leu	Gly	Lys	Thr	Val	Pro	Leu	Glu		
915						920					925						
tca gag ttt gtg aag tgg agg gat gat gtc gta gtt ccc tgc ggc aag															2832		
Ser	Glu	Phe	Val	Lys	Trp	Arg	Asp	Asp	Val	Val	Val	Pro	Cys	Gly	Lys		
930						935					940						
ccg gtg cca tca tca att agg agc tct gaa ctc atg tac aat gag tac															2880		
Pro	Val	Pro	Ser	Ser	Ile	Arg	Ser	Ser	Glu	Leu	Met	Tyr	Asn	Glu	Tyr		
945						950					955			960			
atc gtc tac aac aca tcc cag gtg aag atg cag ttc ttg ctg aag gtg															2928		
Ile	Val	Tyr	Asn	Thr	Ser	Gln	Val	Lys	Met	Gln	Phe	Leu	Lys	Val			
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Arg Phe His His Lys Arg *
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683, 684, 685, 686, 693, 699, 703, 706, 707, 708, 709, 710
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35 40 45
Met Trp Asn His Ala Arg Cys Ile Phe Ser Lys Lys Asn Gln Ile Lys
50 55 60
Ser Val Asp Asp Val Glu Gly Ile Asp Ala Leu Arg Trp Asp Asp Gln
65 70 75 80
Glu Lys Ile Arg Asn Tyr Val Gly Ser Ala Ser Ala Gly Thr Ser Ser
85 90 95
Thr Ala Ala Pro Pro Glu Lys Cys Thr Ile Glu Ile Ala Pro Ser Ala
100 105 110
Arg Thr Ser Cys Arg Arg Cys Ser Glu Lys Ile Thr Lys Gly Ser Val
115 120 125
Arg Leu Ser Ala Lys Leu Glu Ser Glu Gly Pro Lys Gly Ile Pro Trp
130 135 140
Tyr His Ala Asn Cys Phe Phe Glu Val Ser Pro Ser Ala Thr Val Glu
145 150 155 160
Lys Phe Ser Gly Trp Asp Thr Leu Ser Asp Glu Asp Lys Arg Thr Met
165 170 175
Leu Asp Leu Val Lys Asp Val Gly Asn Asn Glu Gln Asn Lys Gly
180 185 190
Ser Lys Arg Lys Lys Ser Glu Asn Asp Ile Asp Ser Tyr Lys Ser Ala
195 200 205
Arg Leu Asp Glu Ser Thr Ser Glu Gly Thr Val Arg Asn Lys Gly Gln
210 215 220
Leu Val Asp Pro Arg Gly Ser Asn Thr Ser Ser Ala Asp Ile Gln Leu
225 230 235 240
Lys Leu Lys Glu Gln Ser Asp Thr Leu Trp Lys Leu Lys Asp Gly Leu
245 250 255
Lys Thr His Val Ser Ala Ala Glu Leu Arg Asp Met Leu Glu Ala Asn
260 265 270
Gly Gln Asp Thr Ser Gly Pro Glu Arg His Leu Leu Asp Arg Cys Ala
275 280 285
Asp Gly Met Leu Phe Gly Ala Leu Gly Pro Cys Pro Val Cys Ala Asn
290 295 300
Gly Met Tyr Tyr Tyr Asn Gly Gln Tyr Gln Cys Ser Gly Asn Val Ser
305 310 315 320

Glu Trp Ser Lys Cys Thr Tyr Ser Ala Thr Glu Pro Val Arg Val Lys
 325 330 335
 Lys Lys Trp Gln Ile Pro His Gly Thr Lys Asn Asp Tyr Leu Met Lys
 340 345 350
 Trp Phe Lys Ser Gln Lys Val Lys Lys Pro Glu Arg Val Leu Pro Pro
 355 360 365
 Met Ser Pro Glu Lys Ser Gly Ser Lys Ala Thr Gln Arg Thr Ser Leu
 370 375 380
 Leu Ser Ser Lys Gly Leu Asp Lys Leu Arg Phe Ser Val Val Gly Gln
 385 390 395 400
 Ser Lys Glu Ala Ala Asn Glu Trp Ile Glu Lys Leu Lys Leu Ala Gly
 405 410 415
 Ala Asn Phe Tyr Ala Arg Val Val Lys Asp Ile Asp Cys Leu Ile Ala
 420 425 430
 Cys Gly Glu Leu Asp Asn Glu Asn Ala Glu Val Arg Lys Ala Arg Arg
 435 440 445
 Leu Lys Ile Pro Ile Val Arg Glu Gly Tyr Ile Gly Glu Cys Val Lys
 450 455 460
 Arg Thr Lys Cys Cys His Leu Ile Cys Ile Asn Trp Asn Ala Leu Glu
 465 470 475 480
 Ser Ser Lys Gly Xaa Thr Val Thr Val Lys Val Lys Gly Arg Ser Ala
 485 490 495
 Cys Ser Xaa Ser Pro Xaa Val Cys Lys Asn Thr Ala His Ile Pro Xaa
 500 505 510
 Xaa Trp Glu Lys His Ile Gln Cys Xaa Leu Lys His Val Leu Thr Xaa
 515 520 525
 His Xaa Val Cys Thr Gly Tyr Tyr Val Leu Gln Ile Ile Glu Gln Asp
 530 535 540
 Asp Gly Ser Glu Cys Tyr Val Phe Arg Lys Trp Gly Arg Val Gly Ser
 545 550 555 560
 Glu Lys Ile Gly Gly Gln Lys Leu Glu Glu Met Ser Lys Thr Glu Ala
 565 570 575
 Ile Lys Glu Phe Lys Arg Leu Phe Leu Glu Lys Thr Gly Asn Ser Trp
 580 585 590
 Glu Ala Trp Glu Cys Lys Thr Asn Phe Arg Lys Gln Pro Gly Arg Phe
 595 600 605
 Tyr Pro Leu Asp Val Asp Tyr Gly Val Lys Lys Ala Pro Lys Arg Lys
 610 615 620
 Asp Ile Ser Glu Met Lys Ser Ser Leu Ala Pro Gln Leu Leu Glu Leu
 625 630 635 640
 Met Lys Met Leu Phe Asn Val Glu Thr Tyr Arg Ala Ala Met Met Glu
 645 650 655
 Phe Glu Xaa Asn Met Ser Glu Met Pro Leu Gly Lys Leu Ser Xaa Xaa
 660 665 670
 Asn Ile Glu Xaa Gly Phe Glu Ala Leu Thr Xaa Xaa Xaa Leu Phe
 675 680 685
 Glu Gly His Arg Xaa Ser Ser Thr Gly Leu Xaa Glu Lys Ala Xaa Leu
 690 695 700
 Leu Xaa Xaa Xaa Xaa Xaa Phe Ser Leu Leu Ser Leu Leu Phe Ile Leu
 705 710 715 720
 Ile Leu Tyr Gly Met Arg Met Ile Ser Tyr Ser Lys Ala Lys Met Leu
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 Glu Ala Leu Gln Asp Ile Glu Ile Ala Ser Lys Ile Val Gly Phe Asp
 740 745 750
 Ser Asp Ser Asp Glu Ser Leu Asp Asp Lys Tyr Met Lys Leu His Cys
 755 760 765

Asp Ile Thr Pro Leu Ala His Asp Ser Glu Asp Tyr Lys Leu Ile Glu
 770 775 780
 Gln Tyr Leu Leu Asn Thr His Ala Pro Thr His Lys Asp Trp Ser Leu
 785 790 795 800
 Glu Leu Glu Glu Val Phe Ser Leu Asp Arg Asp Gly Glu Leu Asn Lys
 805 810 815
 Tyr Ser Arg Tyr Lys Asn Asn Leu His Asn Lys Met Leu Leu Trp His
 820 825 830
 Gly Ser Arg Leu Thr Asn Phe Val Gly Ile Leu Ser Gln Gly Leu Arg
 835 840 845
 Ile Ala Pro Pro Glu Ala Pro Val Thr Gly Tyr Met Phe Gly Lys Gly
 850 855 860
 Leu Tyr Phe Ala Asp Leu Val Ser Lys Ser Ala Gln Tyr Cys Tyr Val
 865 870 875 880
 Asp Arg Asn Asn Pro Val Gly Leu Met Leu Leu Ser Glu Val Ala Leu
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 Gly Asp Met Tyr Glu Leu Lys Lys Ala Thr Ser Met Asp Lys Pro Pro
 900 905 910
 Arg Gly Lys His Ser Thr Lys Gly Leu Gly Lys Thr Val Pro Leu Glu
 915 920 925
 Ser Glu Phe Val Lys Trp Arg Asp Asp Val Val Val Pro Cys Gly Lys
 930 935 940
 Pro Val Pro Ser Ser Ile Arg Ser Ser Glu Leu Met Tyr Asn Glu Tyr
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 att ctt agt caa ggg cta aga att gca cct cct gag gca cct gtt act 96
 Ile Leu Ser Gln Gly Leu Arg Ile Ala Pro Pro Glu Ala Pro Val Thr
 20 25 30
 ggc tat atg ttc ggc aaa ggc ctc tac ttt gca gat cta gta agc aag 144
 Gly Tyr Met Phe Gly Lys Gly Leu Tyr Phe Ala Asp Leu Val Ser Lys
 35 40 45
 agc gca caa tac tgt tat gtg gat agg aat aat cct gta ggt ttg atg 192
 Ser Ala Gln Tyr Cys Tyr Val Asp Arg Asn Asn Pro Val Gly Leu Met
 50 55 60

ctt ctt tct gag gtt gct tta gga gac atg tat gaa cta aag aaa gcc	240
Leu Leu Ser Glu Val Ala Leu Gly Asp Met Tyr Glu Leu Lys Lys Ala	
65 70 75 80	
acg tcc atg gac aaa cct cca aga ggg aag cat tcg acc aag gga tta	288
Thr Ser Met Asp Lys Pro Pro Arg Gly Lys His Ser Thr Lys Gly Leu	
85 90 95	
ggc aaa acc gtg cca ctg gag tca gag ttt gtg aag tgg agg gat gat	336
Gly Lys Thr Val Pro Leu Glu Ser Glu Phe Val Lys Trp Arg Asp Asp	
100 105 110	
gtc gta gtt ccc tgc ggc aag ccg gtg cca tca tca att agg agc tct	384
Val Val Val Pro Cys Gly Lys Pro Val Pro Ser Ser Ile Arg Ser Ser	
115 120 125	
gaa ctc atg tac aat gag tac atc gtc tac aac aca tcc cag gtg aag	432
Glu Leu Met Tyr Asn Glu Tyr Ile Val Tyr Asn Thr Ser Gln Val Lys	
130 135 140	
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145 150 155	

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<212> PRT
<213> Zea mays

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Gly Tyr Met Phe Gly Lys Gly Leu Tyr Phe Ala Asp Leu Val Ser Lys	
35 40 45	
Ser Ala Gln Tyr Cys Tyr Val Asp Arg Asn Asn Pro Val Gly Leu Met	
50 55 60	
Leu Leu Ser Glu Val Ala Leu Gly Asp Met Tyr Glu Leu Lys Lys Ala	
65 70 75 80	
Thr Ser Met Asp Lys Pro Pro Arg Gly Lys His Ser Thr Lys Gly Leu	
85 90 95	
Gly Lys Thr Val Pro Leu Glu Ser Glu Phe Val Lys Trp Arg Asp Asp	
100 105 110	
Val Val Val Pro Cys Gly Lys Pro Val Pro Ser Ser Ile Arg Ser Ser	
115 120 125	
Glu Leu Met Tyr Asn Glu Tyr Ile Val Tyr Asn Thr Ser Gln Val Lys	
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145 150 155	

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caagaagaac cagataaaat ccgttgacga tggtaaggAG atagatgcac tttagatgg 180
tgatcaagAG aagatacgAA actacgttgg gagtgccCTCA gctggtacAA gtttacAGC 240
tgctccctct gagaATgtA caattggAG tgctccatCT gcccgtactt catgtAGACG 300
atgcagtgAA aagattacaA aaggatcggt ccgttttca gctaagcttAg aggtGAAGG 360
tcccAaggGT ataccatggT atcatGCCA ctgtttctt gaggtatccc cgtctgcaac 420
tgttgagaAG ttctcaggCT gggataactt gtccgatgag gataagagAA ccatgctcga 480
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